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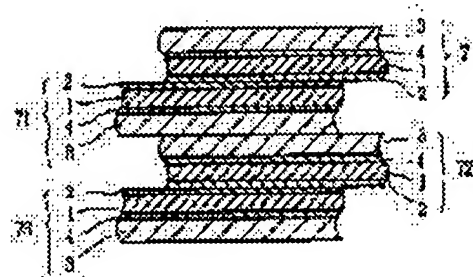
## (54) METHOD FOR CURING POLARIZING PLATE WITH TACKY ADHESIVE LAYER

(57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain a method for curing polarizing plates with tacky adhesive layers with which the formation of the dents occurring in the permanent set in winding and curling is lessened by cutting the polarizing plates with the tacky adhesive layers to a specified size and curing the polarizing plates in stacked state in such a manner that the lamination constitution is alternately reversed.

**SOLUTION:** The polarizing plates 7, 71, 72, 73 with the tacky adhesive layers are superposed on each other by reversing the lamination constitution thereof. The polarizing plates 7 and 72 with the tacky adhesive layers are the same in the lamination direction and 71 and 73 are front and rear to 7 and 72, i.e., in the direction

reverse therefrom in the lamination constitution. Namely, the polarizing plates 7 and 71 with the tacky adhesive layers and 72 and 73 are superposed by disposing surface protective films 2 and 2 opposite to each other and the polarizing plates 71 and 72 with the tacky adhesive layers are superposed by disposing release paper 3, 3 opposite to each other. Since the polarizing plates are cured in such a state, the need for interleaving paper as a cushion property is eliminated and the curling which occurs when the polarizing plates are rolled is substantially annihilated and therefore, the formation of the dents which are the defects in appearance on the polarizing plates with the tacky adhesive layers used for liquid crystal display devices is drastically lessened.



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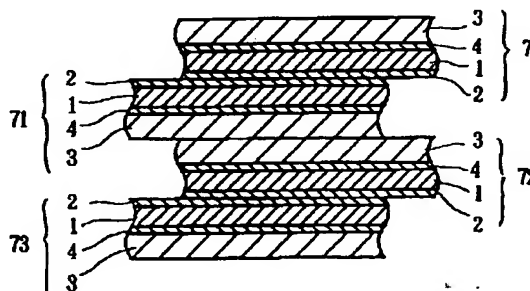
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(54)【発明の名称】 粘着層付偏光板の養生方法

(57)【要約】

【課題】 巻きぐせやカールを大幅に消失させることができ、巻きぐせやカールに起因する打痕の発生が少ない粘着層付偏光板の養生方法を提供する。

【解決手段】 片面に表面保護フィルムが貼り合わされ、他の面に粘着層と離型紙とがこの順に積層された粘着層付偏光板の粘着層を養生するに際し、該粘着層付偏光板を一定の大きさに裁断し、積層構成が交互に逆となるように積み重ねた状態で養生する。



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## 【特許請求の範囲】

【請求項1】片面に表面保護フィルムが貼り合わされ、他の面に粘着層と離型紙とがこの順に積層された粘着層付偏光板の粘着層を養生するに際し、該粘着層付偏光板を一定の大きさに裁断し、積層構成が交互に逆となるように積み重ねた状態で養生することを特徴とする粘着層付偏光板の養生方法。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、液晶表示装置等のガラス基板に接着固定される前の、偏光板の片面に粘着層が形成された粘着層付偏光板の養生方法に関する。

【0002】

【従来の技術】液晶表示装置等に使用される偏光板の片面に粘着剤層が設けられた粘着層付偏光板の従来から行われている製造方法は、片面に表面保護フィルムが積層され、原反ロールとして巻かれた偏光板を繰り出して、表面保護フィルムが積層されていない面に粘着剤層を形成し、長さ100～300mの太巻きロールとして一旦巻取られる。これを再び繰り出して50cm～1mの一定長さのシート状に切断し、これを積み重ねた状態で粘着剤層が硬化するまで養生する。その後、最終形状にトリミングし、離型紙を剥離して液晶セルに貼り合わせる。このように粘着層付偏光板は異なる複数種類の材料による積層構成を有するものである。図2は上記のようにして得られた粘着層付偏光板の一例を示す断面図である。

【0003】粘着層付偏光板は粘着剤が硬化するまで静置状態で養生される。これは粘着剤が十分に硬化しないうちに移動、運搬等の取扱いをすると、その間に受ける衝撃や圧縮により粘着剤層に生じた変形が回復しないまま固化していわゆる「打痕」となり、この打痕が画像の歪み等、液晶表示の致命的欠陥となるからである。ところで従来は、シート状としたものを図3に示すように、積層構成を同方向にして積み重ねて養生していた。粘着剤が硬化するまでの時間は、粘着剤の種類や環境温度その他の条件によって異なるが、通常は2～5日という長時間を要する。従って、その間の偏光板の養生形態は重要である。

【0004】上記打痕の発生を防止する方法として、特開平5-273545号公報には、偏光板粘着シートとクッション性に富む合紙とを重ねて、巻き芯に巻き重ねる方法が記載されている。上記公報に記載の方法によると、クッション性に富む合紙を偏光板粘着シートに重ねることにより、取扱い時に外からの打撃や圧縮力、巻取りの張力による圧力等が緩和され、粘着剤層に打痕の原因となる変形が発生しにくくなる。

【0005】

【発明が解決しようとする課題】しかし、粘着加工後の偏光板をロール状の形態のまま養生すると、偏光板に巻

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きぐせが付いてしまう。そこで、粘着加工された偏光板を或る一定の大きさのシート状に裁断し、これを重ねて養生するのが一般的であるが、偏光板をシート状のものとして積み重ねて養生する際には、図4に示すように、断面において粘着層付偏光板の積層構成が同方向となるようにして重ねられる。巻きぐせが付いた粘着層付偏光板をシート状に切断し、巻きぐせを同方向即ち積層構成を同方向として多数枚重ねても巻きぐせは容易に消失しない。このまゝの状態では養生すると粘着剤層に歪みや変形が生じて打痕の原因となる。

【0006】粘着層付偏光板は異なる数種類の材質からなる積層体であるため、巻きぐせ以外に環境温度その他の条件により少なからずカールが起こる。同方向にカールが生じた粘着層付偏光板を上記従来のように、その積層構成を同方向にして積み重ねて養生すると、他の粘着層付偏光板の粘着剤層に対して変形を起こさせる原因となり、又、カールを消失させる力が作用しないため、結果として打痕が発生することとなる。従って、粘着層付偏光板に巻きぐせやカールが起こることは大きな欠陥である。

【0007】本発明は上記従来の問題点を解消し、巻きぐせやカールを大幅に消失させることができ、巻きぐせやカールに起因する打痕の発生が少ない粘着層付偏光板の養生方法を提供することを目的とする。

【0008】

【課題を解決するための手段】本発明の粘着層付偏光板の養生方法は、片面に表面保護フィルムが貼り合わされ、他の面に粘着層と離型紙とがこの順に積層された粘着層付偏光板の粘着層を養生するに際し、該粘着層付偏光板を一定の大きさに裁断し、積層構成が交互に逆となるように積み重ねた状態で養生することを特徴とするものである。

【0009】偏光板はポリビニルアルコール（PVA）のベースフィルムにヨウ素を配合させた多ハロゲン偏光膜や、PVAフィルムに2色性染料を組み合わせた染料偏光膜等の偏光膜の両面にアセチルセルロースフィルム等が積層された、厚みが約100～300μmのものである。偏光板の片面にはポリエチレンフィルム等の易剥離性の保護フィルムが貼り合わされ、他の面には粘着剤層が設けられ、その上に離型紙が積層される。

【0010】粘着剤としては、光の透過性、耐久性等の面からアクリル系のものが好ましく、例えば、ブチルアクリレート-ヒドロキシアクリレート（BA-HEA）共重合体等をベースとし、これを溶剤で溶解しイソシアネート系などの硬化剤を配合したものなどが好適である。

【0011】離型紙は、クラフト紙、グラシン紙、パーチメント紙、ポリエチレンテレフタレート（PET）フィルム等を基材とし、必要ならば表面にポリエチレンラミネート、及び下塗剤を塗布した上にシリコンによる

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離型処理がなされたものである。

【0012】(作用)本発明による養生方法によると、粘着層付偏光板をシート状とし、且つ、積層構成を交互に逆にして重ねて養生するので、ロール状に巻かれたために発生する巻きぐせを消失させる。更に、粘着層付偏光板は異なる数種類の材質からなる積層体であるために発生するカールの発生もなくなり、打痕の発生を非常に少なくすることができる。

【0013】

【発明の実施の形態】次に、本発明粘着層付偏光板の養生方法の実施例を図面を参照して説明する。

(実施例)図1は液晶表示装置等に使用される粘着層付偏光板の製造方法の概略を示す側面図である。図1において、偏光板原反ロール10はPVAベースフィルムにヨウ素が含まれ、配列されたものの両面にトリアセチルセルロースフィルムが積層された、厚み200μm、幅650mmの偏光板1の片面にポリエチレンの易剥離性表面保護フィルム2が貼り合わされ、該表面保護フィルム2を外側にして長さ200mでロール状に巻かれたものである。

【0014】離型紙ロール30から繰り出した離型紙3(ポリエチレンテレフタレートフィルム、厚み125μm)の離型処理面に、塗工機4により粘着剤を塗工し、乾燥装置5で乾燥して粘着剤層を形成した。粘着剤はブチルアクリレート-ヒドロキシエチルアクリレート共重合体25重量部、トルエン75重量部にエポキシ系硬化剤0.01重量部を添加したものである。

【0015】上記偏光板1の表面保護フィルム2が貼り合わされていない面に上記粘着剤層を貼り合わせ、圧着ロール6、6で圧着して積層した長尺の粘着層付偏光板7を離型紙を外側にして巻芯70に巻いてロール状とした。これを再び繰り出しながら65cm×65cmの大きさに切断してシート状とした。

【0016】図2は上記のようにして得た粘着層付偏光板7を拡大した断面図である。図3は本発明の粘着層付偏光板の養生方法の実施例を示す断面図であり、上記のようにして得たシート状の粘着層付偏光板7を複数枚積み重ねたものの一部を示すものである。粘着層付偏光板7、71、72、73を積層構成を逆にして積み重ねた状態である。粘着層付偏光板7と72は積層方向が同じであり、71と73は7と72に対して表裏即ち積層構

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成は逆方向である。即ち、粘着層付偏光板7と71、及び72と73とは表面保護フィルム2、2同士が、粘着層付偏光板71と72とは離型紙3、3同士が向き合って重ねられている。

【0017】図3の状態では23℃、65%RHの室内に3日間放置して養生した後、1枚ずつの打痕の有無を検査し、打痕率(重ねた粘着層付偏光板全数に対し、1カ所でも打痕が発生したものの百分率)を調べた結果5%であった。

【0018】(比較例1)図4に示すように、積層構成を同方向として積み重ねた以外は実施例と同様にして打痕率を調べた結果55%であった。

【0019】(比較例2)クッション性を有する合紙として障子紙(大きさ80cm×80cm)を粘着層付偏光板の間に挟んだ以外は比較例1と同様にして打痕率を調べた結果7%であった。

【0020】

【発明の効果】本発明粘着層付偏光板の養生方法は以上の構成であり、シート状とした粘着層付偏光板を積層構成を交互に逆として積み重ねた状態で養生するので、クッション性としての合紙を必要とせず、ロール状に巻いたときに発生するカールは殆ど消失するために、液晶表示装置に用いられる粘着層付偏光板に外観上の欠陥である打痕の発生が大幅に低減される。

【0021】

【図面の簡単な説明】

【図1】液晶表示装置等に使用される偏光板の製造方法の概略を示す側面図。

【図2】粘着層付偏光板を拡大して示す断面図。

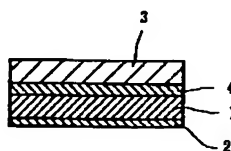
【図3】本発明の粘着層付偏光板の養生方法の実施例を示す断面図。

【図4】従来の粘着層付偏光板の養生方法を示す断面図。

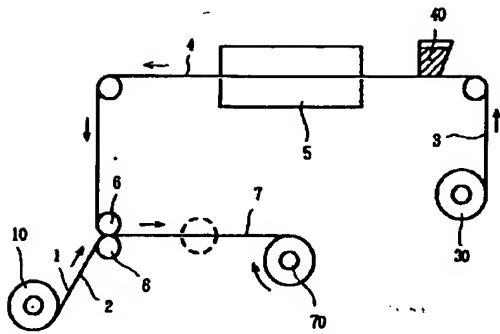
【符号の説明】

- 1 : 偏光板
- 2 : 表面保護フィルム
- 3 : 離型紙
- 4 : 粘着剤層
- 5 : 乾燥装置
- 7, 71, 72, 73 : 粘着層付偏光板

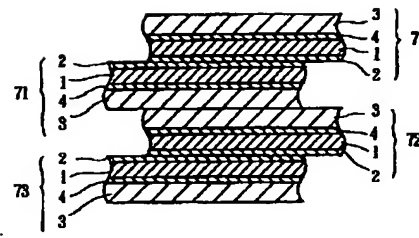
【図2】



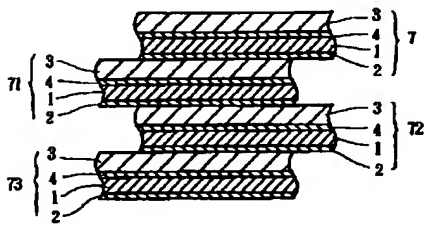
【図1】



【図3】



【図4】



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**CLAIMS**

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[Claim(s)]

[Claim 1] The care-of-health approach of the polarizing plate with an adhesive layer characterized by recuperating oneself in the condition of having put so that the adhesive layer of the polarizing plate with an adhesive layer with which the surface-protection film was stuck on one side, and the laminating of an adhesive layer and the release paper was carried out to this order in other fields might be faced recuperating oneself, this polarizing plate with an adhesive layer might be cut out in fixed magnitude and a laminating configuration might become reverse by turns.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the care-of-health approach of a polarizing plate with an adhesive layer that the adhesive layer was formed in one side of a polarizing plate before adhesion immobilization is carried out at glass substrates, such as a liquid crystal display.

[0002]

[Description of the Prior Art] The laminating of the surface-protection film is carried out to one side, and the manufacture approach currently performed from the former of the polarizing plate with an adhesive layer with which the binder layer was prepared in one side of the polarizing plate used for a liquid crystal display etc. lets out the polarizing plate rolled as an original fabric roll, forms a binder layer in the field where the laminating of the surface-protection film is not carried out, and is once rolled round as a with a die length [ 100-300m ] thick-rolled sushi roll. This is sent out again and it cuts with a fixed die length of 50cm - 1m in the shape of a sheet, and it is recuperated until a binder layer hardens, where this is accumulated. Then, it trims in the last configuration, and it exfoliates and a release paper is stuck on a liquid crystal cell. Thus, the polarizing plate with an adhesive layer has a laminating configuration by two or more kinds of different ingredients. Drawing 2 is the sectional view showing an example of the polarizing plate with an adhesive layer obtained as mentioned above.

[0003] It recuperates itself in the state of standing until a binder hardens the polarizing plate with an adhesive layer. This is because it will solidify while the deformation produced in the binder layer by the impact are shocked between them, or compression has not been recovered, and it will become the so-called "dent" and this dent will serve as a critical defect of liquid crystal displays, such as distortion of an image, if the handling of migration, conveyance, etc. is carried out before a binder fully hardens. By the way, conventionally, in what was made into the shape of a sheet, as shown in drawing 3, the laminating configuration was carried out in this direction, it put, and it was recuperated. Although time amount until a binder hardens changes with the class of binder, or conditions of environmental temperature and others, it usually requires the long duration of two - five days. Therefore, the care-of-health gestalt of a polarizing plate in the meantime is important.

[0004] As an approach of preventing generating of the above-mentioned dent, the method of rolling and putting in piles a polarizing plate pressure sensitive adhesive sheet and the interleaving paper which is rich in cushioning properties on the volume heart is indicated by JP,5-273545,A. According to the approach given in the above-mentioned official report, the blow from outside, compressive force, the pressure by the tension of rolling up, etc. are eased at the time of handling, and it is hard coming to generate the deformation which causes a dent at a binder layer by putting the interleaving paper which is rich in cushioning properties on a polarizing plate pressure sensitive adhesive sheet.

[0005]

[Problem(s) to be Solved by the Invention] However, if it is recuperated in the polarizing plate after adhesion processing with a roll-like gestalt, curliness will be attached to a polarizing plate. Then, the polarizing plate by which adhesion processing was carried out is cut out in the shape of [ of a certain fixed magnitude ] a sheet, and although it is common to recuperate oneself in piles, in case a polarizing plate is accumulated as a sheet-like thing and it is recuperated, as shown in drawing 4, in a cross section, it piles this up, as the laminated structure of a polarizing plate with an adhesive layer serves as



this direction. The polarizing plate with an adhesive layer to which curliness was attached is cut in the shape of a sheet, and even if it piles up several many curliness by making this direction, i.e., a laminating configuration, into this direction, curliness does not disappear easily. If it is recuperated in the state of this \*\*\*\*, distortion and deformation will arise in a binder layer and it will become the cause of a dent.

[0006] Since the polarizing plate with an adhesive layer is a layered product which consists of some kinds of different quality of the materials, curl takes place not a little according to the conditions of environmental temperature and others in addition to curliness. If the laminating configuration is carried out in this direction like above-mentioned before, the polarizing plate with an adhesive layer which curl produced in this direction is accumulated and it is recuperated, in order that the force of becoming the cause of making deformation causing to the binder layer of other polarizing plates with an adhesive layer, and vanishing curl may not act, a dent will occur as a result. Therefore, it is a big defect that curliness and curl take place to a polarizing plate with an adhesive layer.

[0007] This invention can cancel the above-mentioned conventional trouble, curliness and curl can be vanished sharply, and generating of the dent resulting from curliness or curl aims at offering the care-of-health approach of few polarizing plates with an adhesive layer.

[0008]

[Means for Solving the Problem] The care-of-health approach of the polarizing plate with an adhesive layer of this invention faces [ recuperating oneself ] the adhesive layer of the polarizing plate with an adhesive layer with which the surface-protection film was stuck on one side, and the laminating of an adhesive layer and the release paper was carried out to this order in other fields, cuts out this polarizing plate with an adhesive layer in fixed magnitude, and is characterized by recuperating oneself in the condition of having put so that a laminating configuration might become reverse by turns.

[0009] The thickness by which the laminating of the acetyl-cellulose film etc. was carried out to both sides of polarization film, such as multi-halogen polarization film with which the polarizing plate combined iodine with the base film of polyvinyl alcohol (PVA), and color polarization film which combined the dichroic color with the PVA film, is about 100-300 micrometers. The protection film of the easy-releasability of a polyethylene film etc. is stuck on one side of a polarizing plate, a binder layer is prepared in other fields, and the laminating of the release paper is carried out on it.

[0010] As a binder, an acrylic thing is desirable from fields, such as the permeability of light, and endurance, for example, what used the butyl acrylate-hydroxy acrylate (BA-HEA) copolymer etc. as the base, dissolved this with the solvent, and blended curing agents, such as an isocyanate system, is suitable.

[0011] The release paper used kraft paper, glassine, the parchment paper, a polyethylene terephthalate (PET) film, etc. as the base material, when required, the polyethylene lamination and the primer were applied to the front face upwards, and the mold release processing by silicone is made.

[0012] (Operation) Since according to the care-of-health approach by this invention a polarizing plate with an adhesive layer is made into the shape of a sheet, and a laminating configuration is made reverse by turns and it is recuperated in piles, the curliness generated since it was wound in the shape of a roll is vanished. Furthermore, the polarizing plate with an adhesive layer also of generating of the curl generated since it is the layered product which consists of some kinds of different quality of the materials is lost, and can lessen generating of a dent very much.

[0013]

[Embodiment of the Invention] Next, the example of the care-of-health approach of a polarizing plate with this invention adhesive layer is explained with reference to a drawing.

(Example) Drawing 1 is the side elevation showing the outline of the manufacture approach of the polarizing plate with an adhesive layer used for a liquid crystal display etc. It sets to drawing 1, and although iodine was sunk in and arranged by the PVA base film, the easy-releasability surface-protection film 2 of polyethylene is stuck on one side of the polarizing plate 1 with a thickness [ of 200 micrometers ], and a width of face of 650mm with which the laminating of the triacetyl cellulose film was carried out to both sides, and the polarizing plate original fabric roll 10 carries out this surface-protection film 2 outside, and is wound around it in the shape of a roll by die length of 200m.

[0014] Coating of the binder was carried out to the mold release processing side of the release paper 3 (a polyethylene terephthalate film, thickness of 125 micrometers) which it let out from the release paper

roll 30 with the coater 4, it dried to it with the dryer 5, and the binder layer was formed in it. A binder adds the epoxy system curing agent 0.01 weight section in the butyl acrylate-hydroxyethyl acrylate copolymer 25 weight section and the toluene 75 weight section.

[0015] The release paper was carried out outside, was wound around the winding core 70, and the polarizing plate 7 with an adhesive layer of the long picture which stuck by pressure and carried out the laminating of the above-mentioned binder layer to the field where the surface-protection film 2 of the above-mentioned polarizing plate 1 is stuck with lamination and the sticking-by-pressure rolls 6 and 6 was made into the shape of a roll. This was again cut in 65cmx65cm magnitude with the delivery, and it considered as the shape of a sheet.

[0016] Drawing 2 is the sectional view which expanded the polarizing plate 7 with an adhesive layer obtained as mentioned above. Drawing 3 is the sectional view showing the example of the care-of-health approach of the polarizing plate with an adhesive layer of this invention, and although it accumulated two or more polarizing plates 7 with an adhesive layer of the shape of a sheet acquired as mentioned above, it shows a part. It is in the condition which made the laminating configuration reverse and accumulated the polarizing plates 7, 71, 72, and 73 with an adhesive layer. The polarizing plates 7 and 72 with an adhesive layer have the the same direction of a laminating, and the front flesh side of 71 and 73, i.e., a laminating configuration, is hard flow to 7 and 72. That is, as for the polarizing plates 7 and 71 with an adhesive layer, and 72 and 73, the surface-protection film 2 and two comrades faced each other, as for the polarizing plates 71 and 72 with an adhesive layer, a release paper 3 and three comrades faced each other, and it has piled up.

[0017] After leaving it for three days in 23 degrees C and the interior of a room of 65%RH in the state of drawing 3 and recuperating oneself, it was 5%, as a result of inspecting the existence of the dent per sheet and investigating the rate of a dent (it is a percentage to the piled-up polarizing plate total with an adhesive layer although at least one dent occurred).

[0018] (Example 1 of a comparison) As shown in drawing 4, as a result of investigating the rate of a dent like an example, it was 55% except having repeated the laminating configuration as this direction.

[0019] (Example 2 of a comparison) Except having inserted shoji paper (magnitude 80cmx80cm) between polarizing plates with an adhesive layer as interleaving paper which has cushioning properties, as a result of investigating the rate of a dent like the example 1 of a comparison, it was 7%.

[0020]

[Effect of the Invention] Since it is recuperated [ configuration / laminating ] in the condition of having put as reverse by turns, in the polarizing plate with an adhesive layer which the care-of-health approach of a polarizing plate with this invention adhesive layer is the above configuration, and was made into the shape of a sheet, the interleaving paper as cushioning properties is not needed, but in order that most curl generated when it winds in the shape of a roll may disappear, generating of the dent which is an exterior defect is sharply reduced by the polarizing plate with an adhesive layer used for a liquid crystal display.

[0021]

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[Translation done.]